

EXAMINER'S
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PATENT SPECIFICATION



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Complete Accepted : Mar. 2, 1922.

COMPLETE SPECIFICATION.

Improvements in or relating to Ball Bearings.

I, FRIEDRICH HOLLMANN, of Bismarckstrasse, Wetzlar, Germany, a German subject, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

In ball bearings it has already been proposed to arrange the individual rows of balls obliquely with relation to the axis in order, as far as possible, to prevent the balls from grooving the races. The proposal was to place a cage round the balls to cause them to run in the required direction. This method, however, is attended with the defect that in consequence of their oblique position the balls are subjected to considerable friction against the cage, and that the balls themselves only come into contact with the inner race at certain points, so that the race very soon wears down and the bearing works loose. Moreover, this kind of ball bearing cannot be constructed as an oscillatory bearing, and therefore if not very carefully mounted, or if there be any bending of the shaft considerable friction and seizing is set up.

According to the present invention the oblique arrangement of the rows of balls is obtained by providing obliquely arranged grooves on one of the ball-bearing races.

All the balls in a row then run on a comparatively broad surface on the other race so that the balls cannot groove the rings. At the same time the working surface of one of the races may be given a spherical form, concave on the outer race and convex on the inner one. This also affords the advantage that the bearing may be used as an oscillatory bearing and therefore adjust itself automatically

in cases of inaccurate mounting, wear or bending of the shaft. In this way 45 simplicity of construction is combined with much easier running of the bearing, automatic adjustment and longer service.

Several embodiments of the invention 50 are illustrated in the accompanying drawing in which Fig. 1 represents a first embodiment in longitudinal section, parts broken away; Fig. 2 shows an arrangement with only a single row of 55 balls, whilst Figs. 3 and 4 represent forms with two rows of balls on non-parallel planes; and Fig. 5 shows an embodiment in which the inner race is provided with half-grooves. 60

In the embodiment according to Fig. 1, the outer race is indicated by *b*, the inner race by *c* and the grooves by *a*. The balls are marked *d*. The inner surface of the outer race *b* is in the form 65 of a segment of a concave sphere having at its centre the common centre of both races, whilst the grooves *a* in the inner race *c* run obliquely in relation to the axis of the bearing. The result of this 70 arrangement is that the individual balls, for example those in the left hand row, do not run on the same track but along adjacent paths *f*, *g*, *h* so that a broad 75 running surface is obtained on the outer race and therefore a corresponding diminution of wear. 75

In the embodiment according to Fig. 2, only a single row of balls is provided, this row also being arranged obliquely 80 with relation to the axis. In this case, too, the inner surface of the outer race *b* is a segment of a sphere, and the inner race *c* is provided with a groove.

In the embodiment according to Fig. 85 3, two rows of balls are provided, but

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2 unlike the arrangement according to Fig. 1, these rows are not parallel to one another nor in their obliquity with relation to the axis, but enclose a definite 5 angle between them. The diameter of the two rows may also be different.

In the embodiment according to Fig. 4, the rows of balls are also not parallel 10 to each other on the axis, but are arranged symmetrically and are therefore of uniform diameter.

Finally, in the embodiment according 15 to Fig. 5, a rib *f* is provided on the inner race, which rib separates the two rows of balls and slopes away on either side into a half-groove *g* in which the balls run.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is 20 to be performed, I declare that what I claim is:—

1. A ball bearing provided with rows of balls guided obliquely with regard to

the axis by the arrangement in one of the ball races of the usual grooves or half 25 grooves at the requisite angle with regard to the axis.

2. A constructional form of the ball bearing as claimed in Claim 1, in which the outer ball race is provided with a 30 spherical face.

3. A constructional form of the ball bearing as claimed in Claim 1 or 2, wherein the cylindrical surface of the race provided with the oblique grooves 35 is arranged at an angle with regard to its bore.

4. The ball bearings constructed and operating substantially as described and illustrated in the annexed drawings. 40

Dated this 13th day of January, 1922.

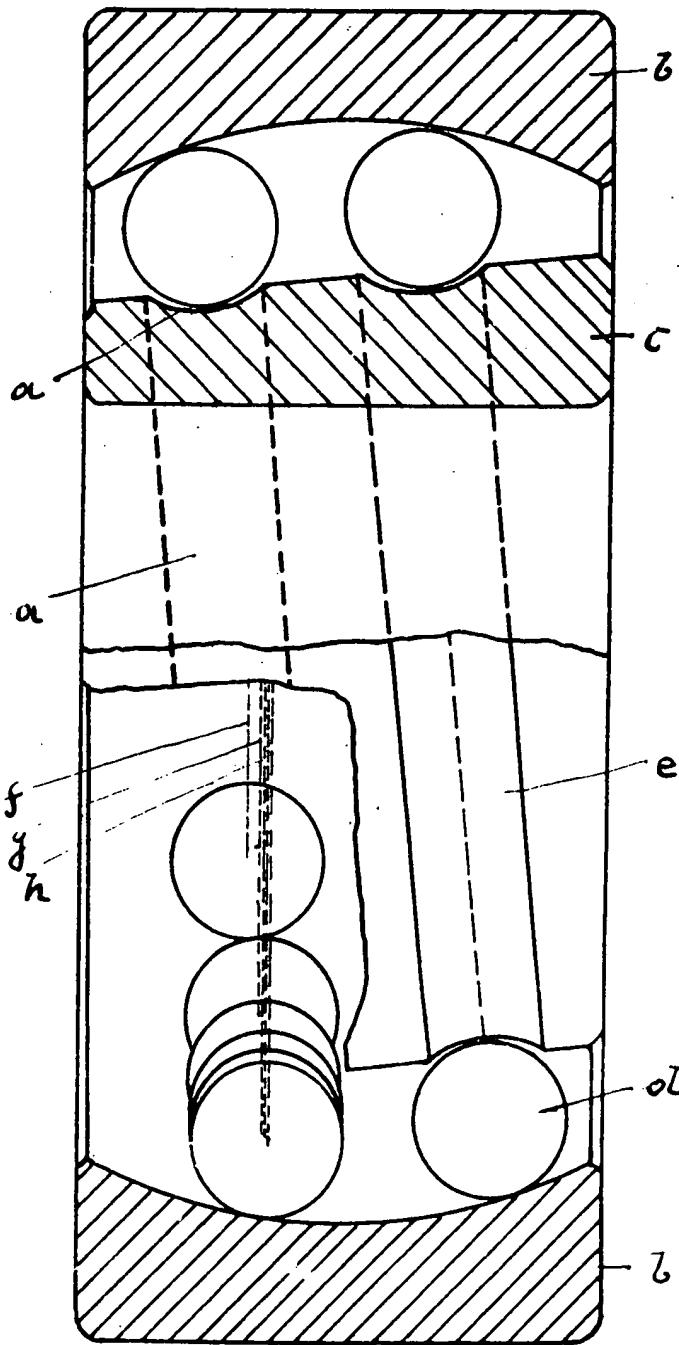
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SHEET 1

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Fig. 1



[This Drawing is a reproduction of the Original on a reduced scale]

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36

2 SHEETS
SHEET 2

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Fig.2

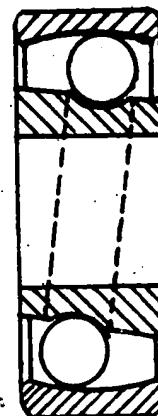


Fig.3

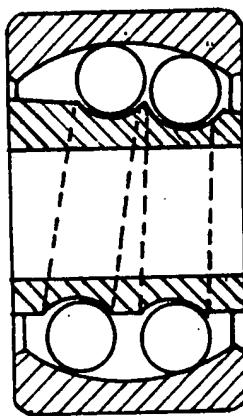


Fig.4

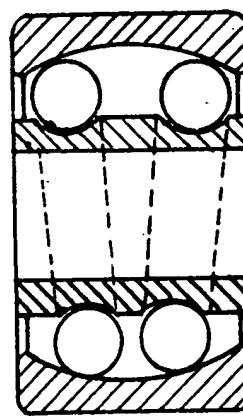


Fig.5

